

and uniform in their geological characters, nor so elevated as those of Norway. Ben Nevis, in Inverness, attains the height of 4,380 feet, and Snowdon, in North Wales, 3,554 feet. In Ireland the highest point is Carran-Tuail, in Kerry, 3,412 feet. In Scandinavia there are no traces of volcanic rocks; but on the west side of Scotland and north shores of Ireland, basalts and trap-rocks are widely spread, and appear to have proceeded from a source lying between, perhaps uniting, the two countries, and now sunk in the ocean.

16. The mountains of France occupy chiefly the southern and eastern departments. The north and north-west parts of the Empire belong to the great plain of northern Europe.

a. The mountains of Auvergne extend about 80 miles north to south between the sources of the Allier, Dordogne, and Lot, thus separating the basins of the Loire and Garonne. They form a table-land 3,500 feet high, from which again rise several conical peaks, evidently the remains of extinct volcanoes. The Puy de Sancy attains 6,680 feet, and Cantal 6,075 feet.

b. East and south of this volcanic mass extend the Cevennes for about 200 miles—the north portion of the chain running north and south with the Rhone on the east; while the south portion, bending to the southward, approaches the Pyrenees, from which it is separated by the depression through which passes the Canal of Languedoc, uniting the Mediterranean Sea and the Atlantic Ocean. The Cevennes form the demarkation of the waters flowing into these two seas. Their elevation is about 3,600 feet; but a few points rise 2,000 feet higher.

c. The Jura Mountains, extending 200 miles north-east and south-west, form a barrier between France and Switzerland. The parallel ridges, chiefly limestone, of the Jura present steep descents toward the south-east, gentle slopes in the opposite direction, and are separated by longitudinal valleys of great length with few transverse breaks. The average height of the Jura is 3,700 feet; but its highest point, the Moleson, reaches 6,560 feet.

d. North of the Jura the banks of the Rhine continue mountainous for a long distance. On the west of that river, between it and the Moselle, rise the Vosges, which form a chain 120 miles in length north to south, with a mean height not exceeding 2,650 feet. The dome-like summits of this chain have received the name of Ballons, and the highest of them, the Ballon-de-Sulz, attains an elevation of 4,680 feet. Granite predominates in the south part of the Vosges, while sedimentary rocks of many kinds are found in the north portion.

From this brief sketch of the mountain chains of France, it may be easily understood why the chief rivers of the country (the Rhine excepted) flow generally to the north and west.

17. France is divided from Spain on the south by the Pyrenees, a narrow chain 250 miles long and hardly 50 miles in breadth, extending in an east-south-east and west-north-west direction from the shores of the Mediterranean to those of the ocean. Some consider the mountains of Asturias and Galicia, which stretch about 300 miles west, as a continuation of the Pyrenees. The central axis of this chain is composed of granite, on which lies limestone. The highest point in the chain, La Maladetta, has an elevation of 11,430 feet, and several other points exceed 10,000. The snow-line is found at 8,300 and 9,000 feet on the north and south sides respectively; but the glaciers of these mountains are few and of small extent, and never descend into the lower valleys.

18. The Pyrenees are separated on the south by the valley of the Ebro, which flows into the Mediterranean, from the elevated plain of the Spanish peninsula. This great plain or table-land, the elevation of which varies from 2,200 to 2,500 feet, has a superficial extent of 9,000 square miles. Toward Portugal the descent is gradual, but on the east, toward Catalonia and Valencia, it presents an abrupt steep with the characters of an ancient sea-margin.

19. This table-land is bounded north and south by chains of mountains running east and west, and between which again lie three other chains inclining from north-east to south-west:

a. The first, or northernmost, of these chains is, in truth, a continuation of the Asturian chain, the highest point of which, the Peña de Europa, probably reaches 8,500 feet.

b. The second chain of the table-land is the Guadarama, which separates the valleys of the Douro and the Tagus. Toward its western extremity it is better known as the Sierra d'Estrella. The highest point of these mountains, which are visible from Madrid, is the Peñaalara, 8,200 feet. On their sides stands the royal palace of Ildefonso, at the height of 8,800 feet.

c. Between the Tagus and Guadiana comes the Sierra Guadalupe, and between the valleys of the Guadiana and Guadalquivir the Sierra Morena, both lower than the preceding, the highest ridge of the former not exceeding 5,100 feet, while the Cumbre de Aracena, the culminating point of the latter, not more than 5,380 feet.

d. But the fifth chain of mountains, that of Granada, called also in its highest part the Sierra Nevada, which bounds the table-land on the south, rises in a few points even higher than the Pyrenees, and in Mulhacen attains 11,660 feet.

e. Between the Sierra Nevada and the sea on the south extends the chain of the Alpujarras, rising to the height of 9,000 feet at the utmost, richly clothed with vineyards to the height of 8,000 feet, and in some places descending abruptly in precipices to the sea.

The low country of the peninsula is of comparatively small extent, embracing only the plains of Aragon and Catalonia, the maritime districts of Valencia and Andalusia, and the middle part of Portugal.

20. The Alps, the highest mountains of Europe, extend uninterruptedly from the mouth of the Rhone to the plains of Hungary. On the south they are bounded by the valley of the Po; on the west by that of the Rhone, and on the north by the valley of the Danube and some of the affluents of the Rhine. On the east they meet the Illyrian chain.

21. With respect to direction the Alps are not uniform, but are divided by geologists into two distinct chains, supposed to be of different ages. The maritime Alps, the north-western part of the system, strikes south-south-west and north-north-east; the high Alps, or principal chain, stretch west-south-west to east-north-east. It is at the point where these two chains cross each other that the Alps attain their greatest elevation, and that Mont Blanc rears its snow-crest 15,782 feet above the sea. Mont Rosa, about 70 miles farther east, rises to within 900 feet of the same elevation, and the average height of the whole range between these two summits can not be taken at less than 11,000 feet. The mean height of the Alps throughout their whole extent is about 8,000 feet, and many points reach an elevation of 12,000 feet.

22. These mountains are divided by longitudinal valleys of great extent, in some of which are formed lakes, so that a chain of lakes extends along the foot of the Alps on both sides—on the north the lakes Geneva, Neuchâtel, Thun, Luzern, Zurich, Constance, etc., and on the south Maggiore, Lugano, Iseo, Garda, etc.

23. The limit of perpetual snow lies but little above the mean height of the mountains, and hence an extensive area of their summits and sides is covered with snow. From these heights vast glaciers also descend along the valleys till they reach in some instances the moderate elevation of 3,000 feet, accumulating at their lowest edge, by their downward movement, immense banks of stones and gravel called moraines. The chief glaciers of the Alps are at the north-west side of Mont Blanc, in the valley of Chamouni; in the country of the Grisons, between the Splügen and the valley of Engadin, and in the Bernese Alps between the sources of the Aar and Rhine.

24. The Apennines may be conveniently—though, from a geological point of view, not perhaps correctly—considered as a branch of the Alps. After a winding course round the Gulf of Genoa, they turn to the south-east, and constitute the central ridge of the Italian peninsula. This chain has a length of 600 miles, with a breadth varying from 20 to 60 miles. In Puglia it spreads into a wide table-land about 1,500 feet high. The highest point of the Apennines is Monte Corno (lat. 42° 27'), 9,519 feet. The loftiest ridges of the chain are on the east side, toward the Adriatic. The prevalent and characteristic rock is a primitive limestone, without fossils. The Euganean Hills, near Padua; the Albanian Hills, near Rome, and Vesuvius, at Naples, are all of volcanic origin, and quite distinct from the Apennines. To the latter, however, belong the mountain groups which, often attaining the height of 6,000 feet, form the island of Sicily; but here again the volcanic Etna, 10,874 feet high, must be regarded, not as a part of, but as an accident in the system.

25. The Dinaric or Illyrian Alps branch off from the High Alps, at the head of the Adriatic Sea, in a direction parallel to that of the Apennines. They rise nowhere higher than 6,000 feet; but overhanging the sea, and occasionally covered with fine forests, they have a grand appearance. After continuing in the same direction for about 200 miles, this chain merges in the Balkan, the Haemus of the ancients, which extends to the Black Sea.

26. As the Pyrenees and Alps cut off the two west peninsulas, so the united chains of the Illyrian Alps and the Balkan separate that of Greece from the continent. South of these, and parallel to the Balkan, runs the Despoti-Dagh—the ancient Rhodope—the east portion of which attains the height of 8,000 feet. Still farther south Pindus strikes to the south-east, and forms the central ridge of the peninsula. It reaches at its greatest elevation 7,000 feet above the sea, and Mount Taygetus, in the Morea, about 1,000 feet higher. The mountains of Greece, though deeply covered with snow during the winter, nowhere reach the line of perpetual congelation.

27. North of the Alps, and extending east, there rise several groups and chains of mountains which collectively separate the basin of the Danube on the north from the basins of the rivers that flow into the North and Baltic seas.

a. At the sources of the Weser we find the Harz, and south of this group the Thuringerwald mountains—the Brocken, in the former, attains the height of 3,600 feet, and the Beerburg, in the latter, 3,075 feet.

b. Then come Fichtelgebirge, the Erzgebirge, and the Böhmerwaldgebirge—the last two chains diverging, the former north-east and the latter south-east, so as to embrace Bohemia.

c. After the Erzgebirge follow the Sudetes, the north portion of which takes the name of Riesengebirge, and here the Riesenkoppe, the highest mountain of Germany north of the Danube, reaches the elevation of 5,390 feet.

d. Farther to the east the Krapatski, or Carpathian chain, incloses the great plain of Hungary, attaining in several places an elevation of 8,000 or 8,500 feet.

28. The Ural Mountains, which serve as a boundary between Europe and Asia, extend nearly on the meridian from north to south, through eighteen degrees of latitude (49° to 67°). The highest known summit of the Ural—the Konjakofski-Kamen (lat. 60°)—reaches an absolute elevation of 5,700 feet; but, generally speaking, the chain is low, and presents to the eye only a series of rounded hills. Toward the south it spreads out into a fan-shaped group of low mountains, covered with thick forests and fine pastures, and therefore much frequented by the Bashkirs. In a line with the Ural (long. 60°) toward the north, the island of Novaia-Zemlia, 300 miles long, stretches north to the 77th parallel.

29. It remains now to describe briefly the plains which, together with the frame-work of mountains, make up the continent. These occupy fully two-thirds of the whole area.

30. The great plain of Europe occupies the eastern part of the continent. On the eastern boundary the plain extends across the continent from south to north—from the mountain range of the Caucasus and shores of the Black Sea to the Arctic Ocean. In width it extends in this part of the continent from the Ural Mountains to the 26th meridian east. To the west of this meridian it terminates on the north on the shores of the Baltic and on the mountain region of Scandinavia; on the south it continues along the south shores of the Baltic, and extends even farther west to the shores of Holland; and if small eminences are not taken into account, it may even be said to continue in a south-west direction through Belgium and the northern parts of France to the banks of the Seine.

31. The portion of the plain west of the 26th meridian is narrowed on the south by the Carpathian Mountains and other ranges which are connected with them. Toward the east it extends over ten degrees of latitude, but in its progress toward the west it becomes gradually narrower till its mean breadth, except where the peninsula of Jutland meets it, does not exceed three degrees. Along the shores of the North Sea it is still narrower.

32. By the narrow portion of the great plain above described and the Baltic Sea (which may be considered as its lowest part, being covered with water) the mountain regions which constitute the western portion of the continent are divided into two separate systems. To the north lies the system of the Scandinavian mountains, and to the south what may be properly called the South European mountain system.

33. Owing to the vast extent of the great European plain, it can attain a considerable elevation by an ascent quite imperceptible; and hence we find the ridge of Valdai, which separates the basins of the Volga and Dnieper flowing into the Caspian and Black seas from that of the Dvina which empties into the Baltic, has an absolute height of nearly 1,200 feet. Besides this great plain, or series of plains, there are several others too important to be passed over in silence: these are the plains of Bohemia and the plains of Hungary—the latter with an area of 40,000 square miles, a great part of which is perfectly level. The plain of Lombardy, through which the Po has its course, is also of considerable extent.

GEOGRAPHY OF EUROPE.



1. Europe is the least of the great land divisions of the globe, and yields to the others not only in general grandeur of scale, but also in appreciable gifts—noble rivers, luxuriant variety of vegetation, and mineral treasures. Yet it is remarkable for its decided superiority in arms and industry, and as the quarter wherein civilization, almost constantly progressive, has hitherto attained its most perfect development.

2. Though called a continent, Europe might be more justly entitled a great peninsula. It is bounded on the west by the Atlantic Ocean; on the north by the Arctic, and on the south by the Med-

iterranean and its connected seas, which separate it from Africa and part of Asia. The main body of Asia is separated by the line of the Caucasus, the Caspian Sea, the river Yaik or Ural, the Ural Mountains, and the river Kara.

3. The most northern point of Europe on the mainland is Cape Nordkyn, in Lapland (lat. 71° 04' north), and the most southern point, Punta da Tarifa (lat. 36°), in the Strait of Gibraltar, and Cape Matapan (lat. 36° 17'), which terminates the Morea. The island of Candia reaches a little south of lat. 35°, and North Cape, on Magora, lies about four miles north of Cape Nordkyn. On the west, Cape Finisterre (Spain) is in long. 9° 27' west, and Cape Roca (Portugal) in long. 9° 28' west; while Ekaterinburg, in the Ural Mountains, lies in long. 60° 36' east. Thus Europe may be said to extend through 35 degrees of latitude—2,400 miles, and 70 degrees of longitude—3,400 miles. Its land area is about 3,800,000 square miles.

4. Europe is made up of the following parts, each in some measure naturally independent of the rest: the Scandinavian Peninsula; Jutland and the Danish Islands; the British Islands; the Iberian Peninsula (Spain and Portugal); the Italian Peninsula, and that of Greece. Toward the east the continent becomes more compact, or in other words loses in Russia its characteristic peninsular features, and takes a transitional form before it commingles with Asia. But west of Craeow and the Russian territory there is hardly a point which is 300 miles distant from the sea.

5. The Atlantic Ocean, which washes the western shores, takes different names in its various portions. Thus, between the north coast of Spain and the west coast of France lies the Bay of Biscay, where the ocean sweeps rolling into the region of variable and restless winds makes a perpetually troubled sea. Farther north, between France and England, the sea of St. George's Channel is still more noted for uncertain and tempestuous weather. From the Channel a branch running north between Great Britain and Ireland is named the Irish Sea. Here at one spot (lat. 52° 30') on the east coast of Ireland the streams of opposite tides from north and south are so exactly counterbalanced that the sea remains always at its mean level,

while in the British Channel, not far off, the tides often rise 24 feet, and at St. Malo, on the Norman coast, 40 or even 50 feet.

6. The sea between Great Britain and the low countries of Holland and Germany is named the German Ocean or North Sea. From this a great gulf or inland sea branches off to the east, south, north, and east, taking successively the names of Skagerack (the Pass of Rack), Kattegat (the Strait of the Kattil), and the Baltic (or Sea of the Balts or Belts, *i. e.*, narrow passes). In lat. 59° the Gulf of Finland branches off to the east from the Baltic for a length of 250 miles, and from the same latitude the Gulf of Bothnia extends north nearly 500 miles. The whole length of the Baltic Sea from the mouth of the Skagerack to the head of the Gulf of Bothnia can not be less than 1,200 miles. There is no appreciable tide in this sea, and as it receives many rivers, while it loses little by evaporation, its waters are much less salt than those of the ocean, and it is popularly believed that a continuance of north winds renders them quite fresh.

7. North-east of the Gulf of Finland a depressed tract of country with numerous lakes separates that gulf from the White Sea, which is a deep inlet nearly 400 miles in length, from the Arctic Ocean, and extending between the shores of Lapland, Finland, and Russia. The shores of the White Sea are frozen up for seven months of the year.

8. The Strait of Gibraltar, in one place only nineteen miles wide, forms the communication between the Atlantic Ocean and the Mediterranean Sea. The latter has an extension from west to east of 2,500 miles, with a general width perhaps of 500 miles; but owing to its sinuous shores and deep indentations it stretches through fifteen degrees of latitude. Its chief gulfs are the Adriatic Sea, between Italy and Illyria, 500 miles in length, and the archipelago (a name corrupted from *Ægio-pelagus*, *Ægion* Sea) which lies between the Grecian peninsula and Asia Minor.

9. The Black Sea, which is connected with the Archipelago by the Strait of the Bosphorus, Sea of Marmora, and the Strait of the Dardanelles or Hellespont, extends from west to east nearly 700 miles, while its width is from 200 to 300 miles; and here again on the north shores of this sea, even in latitude 45°, we find the rivers and harbors frozen and navigation prevented during five months of the year.

10. The Mediterranean, lying generally under a warm zone (lat. 30° to 45°), is much exhausted by evaporation, and a constant current sets into it from the Atlantic on the one side as well as from the Black Sea on the other. Hence its waters rather exceed in saltiness those of the ocean. Owing to the great magnitude of the Mediterranean the phenomena of tides are perceptible. In the Black Sea there is no tide.

11. The Caspian Sea, which is common also to Asia, has no connection with the ocean, and may be considered rather as a great inland lake.

12. The mountains of Europe form several distinct groups or systems of very different geological dates, and capable of being considered as a whole only from that point of view which discloses their combined influence on the climate, physical character, and capabilities of the continent around them. Into the succinct account here about to be given of them, no particulars shall be admitted which have not this unity of bearing.

13. The Scandinavian mountains, to which the great north peninsula owes its form and in some respects its peculiar climate, extend through thirteen degrees of latitude (58°-71°), or above 900 miles, from the Polar Sea to the south point of Norway. Their direction is generally east-north-east and west-south-west. In succession from the north they bear the names of the Lapland Mountains, the Kioelen, the Dovre, the Sognafeld, and the Hardangerfeld. The highest summits of the chain are Skagetolind on Sognafeld (lat. 61° 24') 8,128 feet, and Snechtatten on the Dovre (lat. 62° 20') 7,550 feet. The highest part of the chain is from the middle southward; but there are many points in the north part, as Sulitelma in Lapland (lat. 67° 05'), which have an elevation exceeding 6,000 feet.

14. The Scandinavian mountains nowhere form a narrow crest at their summits, but on the contrary they expand into plains, fells, or fields, often 30 or 40 miles wide. In the south part of the chain these elevated plains afford pasture during summer to sheep and cattle; but toward the north the bleak wilds produce nothing but moss, which yields subsistence to scattered herds of reindeer. Toward the east the mountain mass declines gradually; while on the west it falls abruptly to the sea, which forms numerous deep inlets or fiords along the coast of Norway. The farther north the more closely do the mountains approach the sea; and we may reasonably infer that a deep ocean washes their precipitous shores.

15. In the British Islands, as in the Scandinavian peninsula, the mountains rise chiefly on the west; and, indeed, the older rocks in both cases seem to lie in parallel courses, as if they formed part of one system. But the mountains of the British group are neither so simple